The effect of nutrition on pregnancy outcomes

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Disclosure

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Outline

• Background – the impact of preconception and gestational nutrition

• Nutritional problems in NZ

• Nutrition and lifestyle factors that affect fertility

• Diet and lifestyle recommendations for planning a pregnancy and for pregnant women
  – Nutrition advice for GP patients
Pre-conception maternal nutrition

• Maternal nutritional intake and status prior to pregnancy is important
  – Ideal to enter pregnancy with adequate body stores/levels
  – Decrease potentially risky lifestyle choices:
    • Alcohol intake
    • Inappropriate nutritional supplementation
    • Medication or drug use
  – Nutrition and lifestyle appear to affect fertility
  – Nutrition affects the health and wellbeing of the offspring in later life
Gestational nutrition

• What a women eats during pregnancy affects both maternal and fetal health via:
  – Adequate fuel and nutrients for optimal fetal growth
  – Risk of:
    • food-borne illness
    • neural tube defects
    • gestational diabetes
    • pre-eclampsia
    • labour and delivery problems
  – Impact of maternal nutrition on the lifelong health of the child
The Barker hypothesis

- “That alterations in foetal nutrition and endocrine status result in developmental adaptations....predisposing individuals to cardiovascular, metabolic and endocrine disease in later life”

- Pre-conception and gestational nutrition has permanent effects on the health of offspring
Long-term effects of malnutrition (human studies)

<table>
<thead>
<tr>
<th>Offspring have:</th>
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<tbody>
<tr>
<td><strong>Lower birth weight</strong>&lt;sup&gt;1, 2&lt;/sup&gt;</td>
</tr>
<tr>
<td>↑ rate of heart disease and higher BMI</td>
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<tr>
<td>↑ risk of hypertension and T2DM</td>
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<tr>
<td>↑ rate of obesity</td>
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<tr>
<td><strong>Higher birth weight</strong>&lt;sup&gt;3&lt;/sup&gt;</td>
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<tr>
<td>↑ rate of obesity</td>
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<tr>
<td>↑ risk metabolic syndrome and T2DM</td>
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<tr>
<td><strong>Maternal hyperglycaemia</strong>&lt;sup&gt;4&lt;/sup&gt;</td>
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<tr>
<td>↑ rate of obesity and metabolic disorders</td>
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The typical NZ diet

- **Too much:**
  - Saturated fat
  - Sugar (e.g. drinks)
  - Sodium / salt
  - Alcohol

- **Not enough:**
  - Dietary fibre
  - Calcium
  - Iron (women)
  - Zinc (men)
  - Selenium
  - Omega-3 fatty acids
  - Fruit and veges

2008/9 NZ Adult Nutrition Survey
NZ body weight statistics (by BMI)

<table>
<thead>
<tr>
<th></th>
<th>Females</th>
<th>Males</th>
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<tbody>
<tr>
<td>Underweight</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Healthy weight</td>
<td>43%</td>
<td>33%</td>
</tr>
<tr>
<td>Overweight</td>
<td>29%</td>
<td>41%</td>
</tr>
<tr>
<td>Obese</td>
<td>26%</td>
<td>25%²</td>
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</tbody>
</table>

- Latest figures have obesity at 29% and 28%²

1. 2006/7 NZ Health Survey
What diet and lifestyle factors affect fertility?

• Alcohol
  – Heavy intake (>8/week) = decreases male and female fertility
  – Moderate intake (7-8/week) = unclear effect
  – Detrimental effect of alcohol in IVF treatment

• Caffeine
  – Most (but not all) studies show a negative effect
  – Negative effect in IVF populations
• **Body weight**
  – **Overweight/obese** = decreased fertility and fecundability, increased gestational risks, negative effect on fertility treatment
  – **Underweight** = decreased female fertility, increased gestational risks

• **Smoking**
  – Clear negative effects on fertility, gestational and fetal health

• **Exercise**
  – Potential negative effect of too much vigorous exercise
Micronutrients, dietary intake & fertility

- Micronutrients
  - Little conclusive evidence

- **Mediterranean diet** may be beneficial for fertility (compared with Western-diet)

- Upward non-haem iron and upward higher fat dairy products may downward risk of ovulatory infertility
Effect of maternal body weight

- **Low pre-pregnancy BMI (i.e. underweight)**
  - Increased risk pre-term or LBW baby

- Poor gestational weight gain is associated with an increased risk restricted fetal growth

- **High pre-pregnancy BMI (i.e. overweight/obese)**
  - Tend to gain more weight and more fat in pregnancy and have heavier infants
  - Can have malnutrition due to low-nutrient excess-energy food choices
Recommended weight gain in pregnancy

• **Dependant on pre-pregnancy BMI**
  – Underweight: 12.5-18kg
  – Healthy weight range: 11.5-16kg
  – Overweight: 7-11kg
  – Obese: 6kg

• **Important!** Discuss appropriate weight gain during pregnancy

• Most weight gain should occur in the 2\(^{nd}\) and 3\(^{rd}\) trimester
Prior to pregnancy

• **Lose weight if overweight or obese**
  – Smaller portions
  – Eat regular meals (BF, L, and D)
  – Healthier food and drinks
  – Exercise / activity

• **Gain weight if underweight**
  – Larger portions
  – Regular meals + snacks
  – Unsaturated fat
    • Add extra oil, margarine, avocado, nuts, seeds
  – Regular (not excessive) exercise
Advice for patients trying to conceive / who are pregnant:

• Eat a wide range of foods daily
• Cut down saturated fat
  • Reduce intake of butter, meat fat, chicken skin, baking, chocolate, takeaways, high fat dairy products, chips, coconut fat/oil
• Cut down sugar and increase fibre
• Avoid fad diets / detox diets
• Be careful with drink choices
• Quit smoking!
• Exercise most days
• Take only evidence-based nutrition supplements
Choose a balanced diet:

- **Wholegrain carbohydrates** (B vitamins and fibre)
- **Lean protein** (iron, zinc, omega-3’s)
  - Include regular red meat, oily fish and vegetarian proteins
- **5+/day fruit & vegetables** (antioxidants and fibre)
- **Low fat** dairy products (calcium and protein)
  - Fortified soy milk if vegan / lactose intolerant
Drinks

- **Low sugar** drinks
  - water, low-fat milk, ‘diet’ or ‘zero’ drinks, herbal tea (check varieties), artificially sweetened drinks
- **Low caffeine** drinks
  - decaf coffee or tea, herbal tea, no energy drinks
- **No alcohol**
  - As little as possible when planning a pregnancy
  - None when pregnant (no ‘safe level’ of intake)
Nutritional supplements

• Improve food intake, don’t just take pills!
• Avoid foreign / homemade supplements
• Avoid certain herbs / teas as per MOH list
• ‘Any’ nutritional supplement was used by 53% of females, and 42% of males\(^1\)
• Most common:
  – oils
  – multi-vitamin / multi-mineral supplements
  – herbal supplements

1. 2008/9 Adult Nutrition Survey
Nutritional supplements for males

• There are **no recommended nutritional supplements** for males trying for a baby

• However, antioxidant supplements **may be useful** for men with sperm problems:
  • Vitamin C, vitamin E, zinc and selenium may improve sperm
  • ‘Menevit’ may improve sperm (small IVF study)
Nutritional supplements for females

- **800mcg folic acid** before conception & for first trimester
  - Some women require **5000mcg/day**:
    - previous NTD / family history of NTD, obese, T1DM, epilepsy meds

- **150mcg iodine** (Neurokare) when pregnant and breastfeeding
  - Kelp supplements are not recommended

- **OR** combined prenatal supplement with adequate folic acid and iodine
• **Iron supplement** if patient has low iron levels
  – Best taken in conjunction with vitamin C to boost absorption (e.g. with colourful veges / piece of fruit)
  – Or can take with vitamin C supplement

• **Vitamin B12** injection if follow strict vegan diet

• Eat **dietary sources of omega-3** rather than take omega-3 supplements

• Women with low calcium intake **may** benefit from 1000-2000mg **elemental calcium** to reduce their risk of pre-eclampsia
Summary

- Encourage patients to have a well-balanced basic diet prior to, and during pregnancy
- Evidence-based nutritional supplements only
- Exercise regularly – daily if possible
- Lose / gain weight as necessary, appropriate weight gain in pregnancy
- Avoid fad diets / excess supplements
Thank you for your attention.

Questions?